Can Developing Countries Pursue the Dual Goal of Carbon Neutral and Economic Growth?

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The world is moving faster towards accelerating net zero emission goals from energy use as early as 2050. This raises the question if all countries could achieve such pathway and in particular if such target and accompanying regulations will disrupt Developing Countries' economic growth? This paper will argue that such goals are feasible for Emerging Economies as well as Developing Economies and that it will not be dependent on technologies being available or aid from Advanced Economies[1].

Reaching the Paris Goals Become Increasingly an Emerging Economies Issue to Achieve

In practical terms, the energy transition to a 1.5°C world is mainly an Advanced and Emerging Economies' problem to solve. With the World population growing 25% over the next 3 decades to 9.7 bln from 7.8 bln today, over 85% will live in Emerging Economies and Developing Economies, while the population in the Advanced Economies will remain stable around 1.1 bln.

World GDP may rise ~130% over this period to 2050. Advanced Economies share in the total pie is around 40% today, while the Emerging Economies share is ~55% and only some 5% from Developing Economies. This will have changed by 2050 with the share of the Advanced Economies declining to around 27%, while that of the Emerging Economies grows by some 10% points to 65%. Developing Economies' share is expected to be one and a half times larger than today. But in GDP/Capita terms the Advanced Economies are about 3 times richer than the Emerging Economies and 10 times than Developing Economies today and that relationship is not expected to move much over the next decades.

World CO_2 emissions from energy today comes for about 64% from Emerging Economies and for about 33% from Advanced Economies with the remaining 3% from the Developing Economies. By 2050 Emerging Economies' share will have grown strongly to ~75% while the Advanced Economies drop to around 20%. In particular China's role in reducing global emissions will be crucial, being about 30% today, which is half of all Emerging Economies. The role of Developing Economies remains very modest and their priority can remain in achieving the UN's Sustainable Development Goals without overdue concern in reducing CO_2 emissions.

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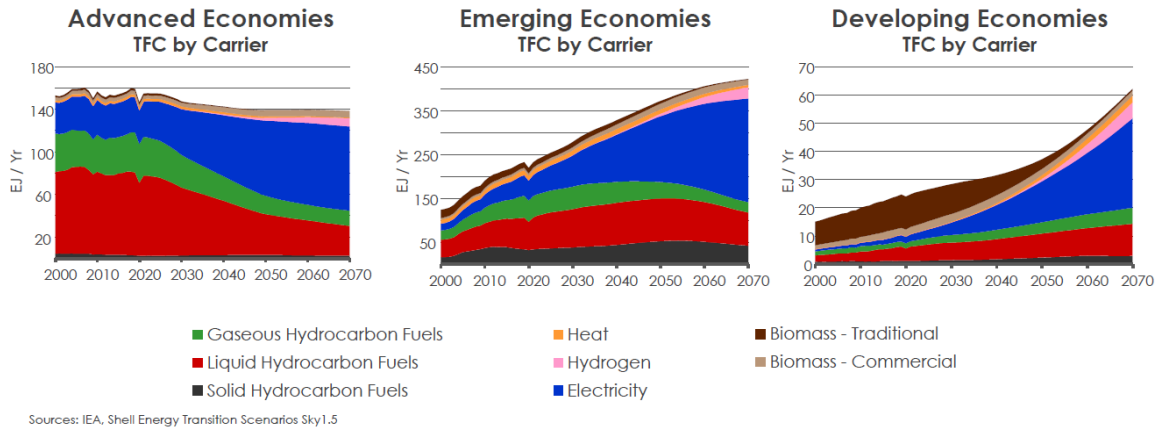
[1] IMF 2020 classification of Advanced, Emerging and Developing Economies are used throughout this paper.

Globalisation and Efficiency Improvements Drive Energy and CO_2 Intensity Reduction

The share of energy use between Advanced Economies and Emerging Economies will remain similar to their shares of global GDP with China being dominant with around 23% of the world and 40% of Emerging Economies. With continuing global economic growth and a strong focus on efficiency, energy intensity as well as CO_2 intensity will continue to decline.

Efficiency and Lower CO_2 Emissions Go Hand in Hand with Electrification

With key countries' pledges to accelerate the energy transition towards net zero by 2050, all type of economies see an acceleration of electricity and bio-mass/fuels use. Presently, electricity share is about a fifth of end-user energy demand, but that will need to more than double over the next 30 years in Advanced Economies and Emerging Economies, while Developing Economies will see a fourfold increase.



Sources: IEA, Shell Energy Transition Scenarios Sky1.5

Wind, Solar and Biomass are the New Energy Sources

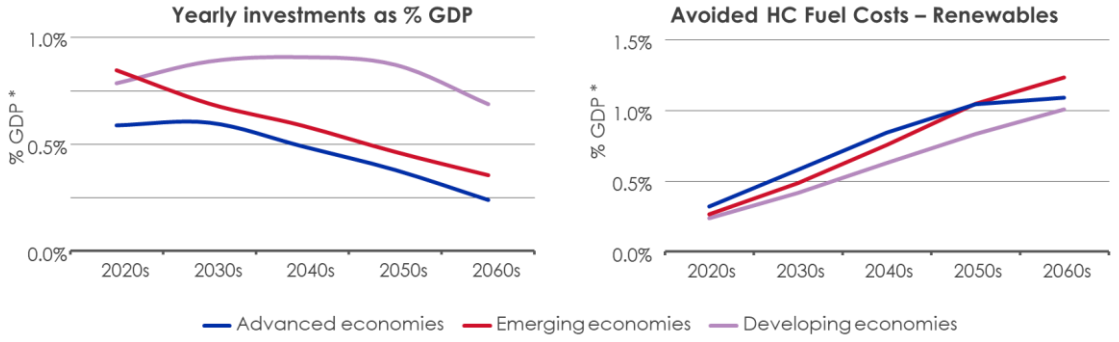
Wind and solar are the new energy sources as the economics of new power generation has already turned the corner in their favour. Wind and solar PV are becoming an order of magnitude cheaper than gas, coal and nuclear, as economies of scale and integration with storage and green hydrogen production will give additional benefits. Remaining gas and coal fired generation get more and more burdened by CO_2 mitigation costs and increasingly being run at low Load Factor for back-up of renewables.

Biomass remains expensive, but necessary to reduce CO_2, also via BECCS[2]. If it ever becomes the marginal price setter in fully developed electricity markets, it could form a solid revenue stream for wind and solar, opening taxation space for governments, which can be used to stimulate or subsidise the energy transition in other sectors.

[2] Bio-Energy Carbon Capture and Storage is a true negative emissions measure, actually removing CO_2 from the atmosphere by storing it underground.

The Energy Transition is Affordable to All Economies

With falling unit costs, the investment cost as a percentage of GDP for Advanced Economies and Emerging Economies come down fast. Unfortunately not so for Developing Economies which will stay longer in a historical range. But this is mainly a GDP effect, so on cost terms they still benefit as well. Cost of investments should also be put in context of avoided fuel costs to estimate the overall effect on economies. All types of economy benefit from avoided fuel cost, reducing overall energy costs as % of GDP. If avoided CO_2 abatement costs are added, the prospect becomes even more compelling. Moreover, investment in renewables will generally create more jobs and hence more economic growth and tax income for States if a country is not a major oil, coal or gas producing country. Renewable Energy cost, once it set its own local price dynamics, will also be less volatile than fossil fuels. Finally, it decreases import dependence, improves trade balance, and helps to reduce energy-related geo-political risks.



* Indicative, mainly Energy supply, excluding upstream, depending on many cost assumptions over time. Relativeness is more important than absolute numbers
Source: Shell Energy Transition Scenarios

Developing Countries Can and Should Pursue the Dual Goal of Carbon Neutral and Economic Growth

On the supply side, economics of new electric energies has already turned the corner in favour of wind and solar PV. So it would be more expensive to remain on the fossil fuel path in many sectors. Emerging Economy China and to an extent India, will have to address faster phase-out of legacy assets though to meet the goals of the Paris Agreement. Industry will be able to look after itself if it competes on the global market, which increasingly demands lower CO_2 products. They will still be able to remain competitive on e.g. labour costs. Moreover, lagging countries risk rising CO_2 related import duties for their export at the border of those countries actively implementing energy transition strategies.

On the demand side it may be a bit more difficult. Energy efficient appliances and buildings are key for lowest CO_2 emissions and overall cost of ownership, but the initial hurdle of higher purchasing and investment costs may inhibit rapid and large scale application. Nevertheless, this end-use (re)design is key for large scale electrification and here government policy intervention

will be needed for setting standards and facilitate financing.

Conclusion

Achieving the Paris Goals is not only a matter for the Advanced Economies. To he contrary, success is highly dependent on the successful implementation of energy transition strategies by the Emerging economies. This is particularly true for China and for those countries that are still burning coal. Fortunately, unit costs are decreasing rapidly, making wind and solar cost competitive globally. It is expected that this will also be the case for hydrogen in the next decade. Beside cost, there are many additional benefits to aggressively execute energy transition strategies by all countries. The required acceleration of actions will benefit from strong cooperation between Advanced and Emerging Economies, and cannot afford that the political agenda gets frustrated or blurred by other political topics. While Advanced and Emerging Economies can largely handle the transition themselves, Developing Economies must get aid to not fall behind. This aid is likely as much in financing as in building institutional and industrial capabilities and capacity.

Writer's Profile

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Mr. Thomas was part of Shell's Scenarios Team, which is part of the Group Corporate Strategy Department. He led a team responsible for worldwide energy analysis and long-term global energy scenarios, and advised Shell's Executive Committee and the Board and its businesses on a wide range of energy issues, including oil & gas markets and pricing, global supply & demand for all energies, regulations, energy policy and industry structure. He had been with the Shell group of companies for some 35 years, with prior international positions in drilling operations, subsurface reservoir management, upstream commercial and regulatory affairs in gas. Presently, he is a non-executive director at MARIN, a world leading maritime research institute in the Netherlands, and on the Advisory Board of the Buccaneer, an accelerator for innovation on sustainable energy in the maritime sector. He is a Fellow of the Energy Institute of the UK and Distinguished Fellow of the IEEJ. He is a former Chairman of The UK National Committee of the World Petroleum Council and of the British Institute of Energy Economics. Wim holds a postgraduate degree in Maritime Technology, Delft University, The Netherlands.